SMT Quality Monitoring

Harald Fox, Northwestern University

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Run Quality DB

- Input for run quality decision:
  - Downtime periods and missing crates (becomes useless).
  - Shifter rating (bad ratings are cross checked).
  - Problems reported in the log book.
- The rating is following Tom's and Stefan's scheme:
  - Runs with unrecoverable data are marked as "useless".
  - Runs with somewhat higher inefficiency that is measurable are marked as "compromised".
  - All other runs are "good".
- Technical side:
  - Input: list of physics runs (not all of the special runs are rated, as SMT is typically off).
  - The start run/end run times are compared to the times where a problem was identified.
 - All runs during this time period get the lowest rating available.

Bad Runs

- **What makes a run bad?**
  - Missing crates.
  - Large scale HV problems.
- **What compromises data quality?**
  - Missing VRBs.
  - Some persistent HV problems that affect a number of HDIs.
  - Threshold screw ups that affect many HDIs.
- **What does not degrade run quality?**
  - Reduced HV on a few HDIs.
  - Disabled HDIs.

Recocert SMT

- Phi distributions of SMT clusters (global and per barrel and layer).
- Number of hits per track (for Barrel, F-disks, H-disks).

SmtClusters (allBarClusters)

SmtClusters (ClustrBar2)
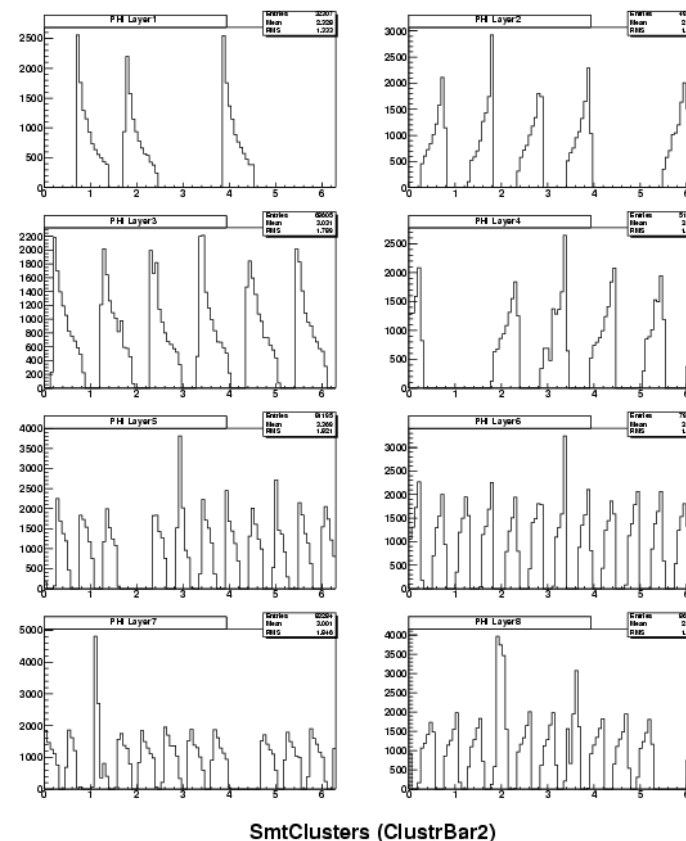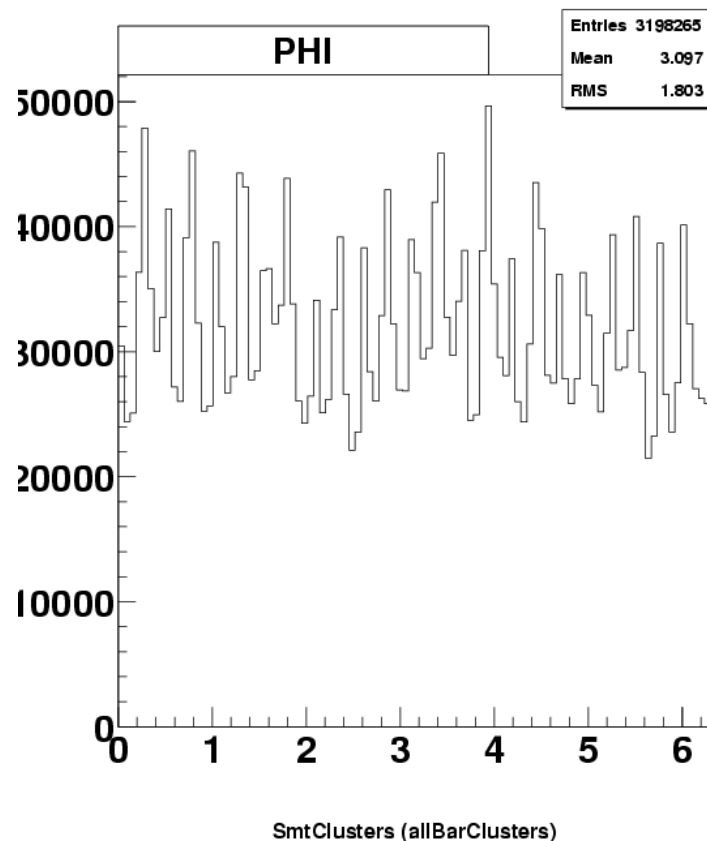
- Planned: efficiency calculation, global and for each HDI.
- Other variables?

Tracks in Recocert

- Reconstructed isolated muons with $p_T > 2.5$ GeV are used to determine the tracking efficiency.

- The efficiency is plotted against various parameters:
  - η
  - Φ
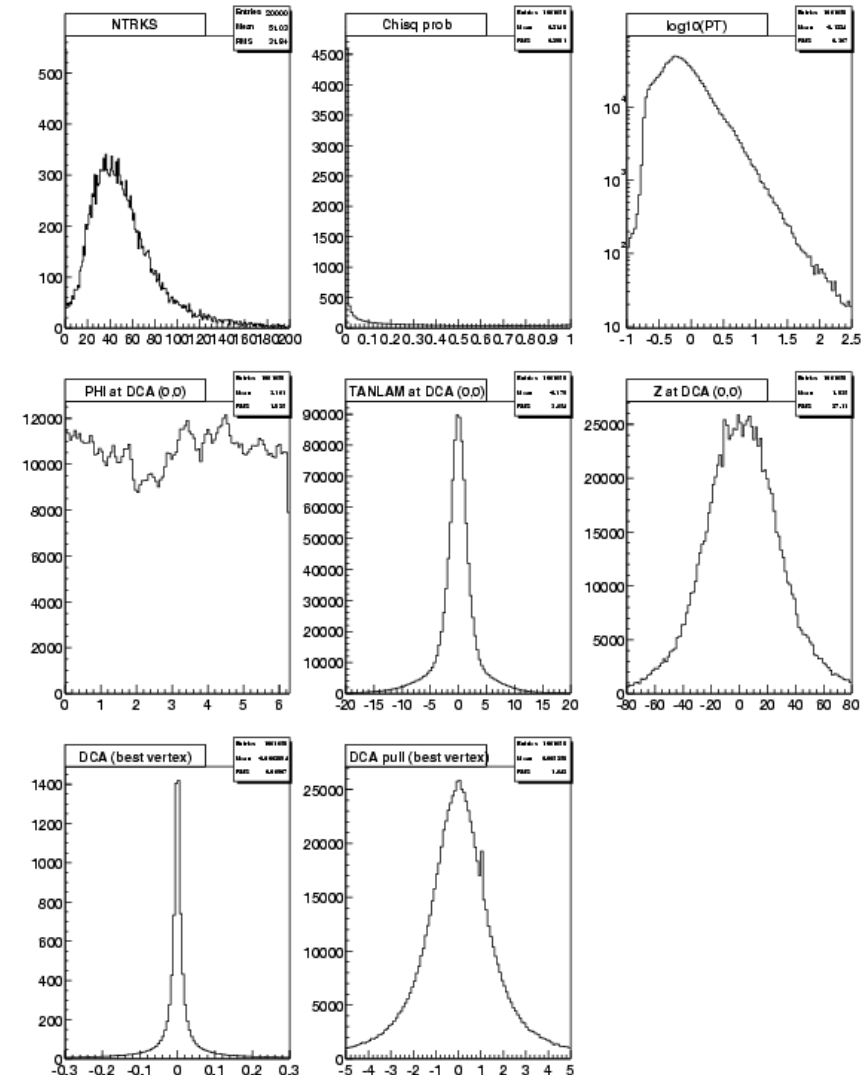 - P_T
  - Charge
  - Tick number
  - Track multiplicity

Tracking (Efficiency)
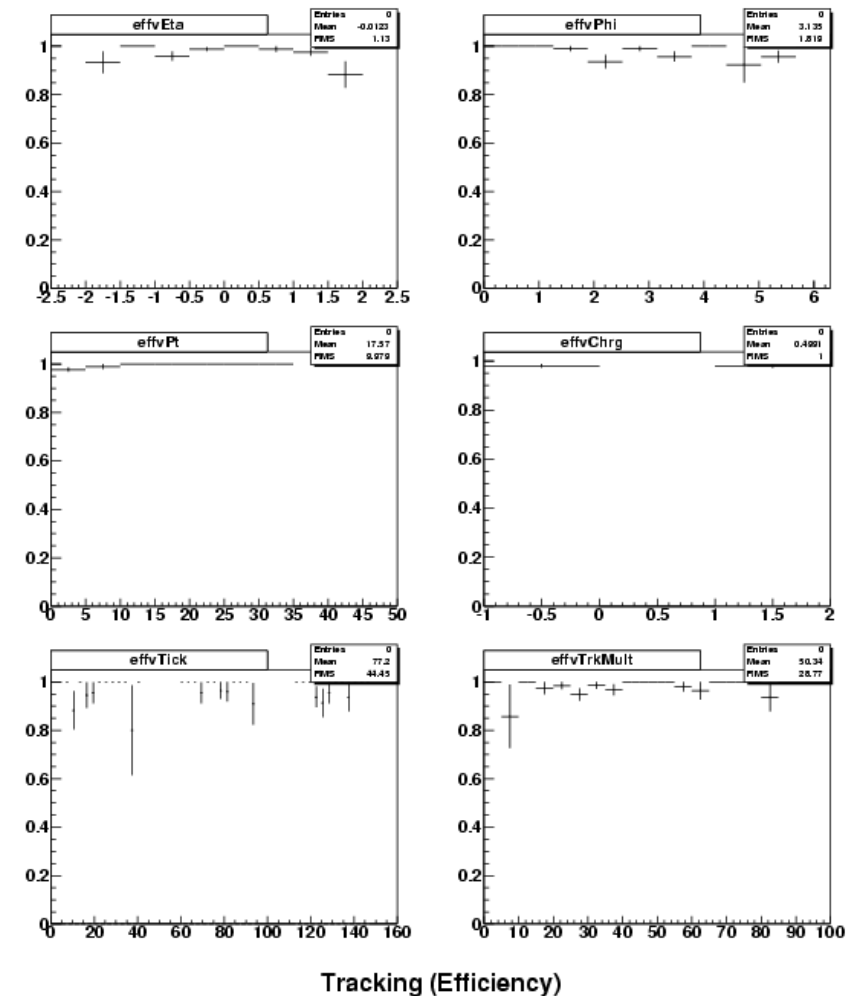
Tracks in Recocert

Monitored track quantities:

- Number of Tracks per event
- χ^2 probability
- P_T distribution
- Φ distribution
- tan λ
- z distribution
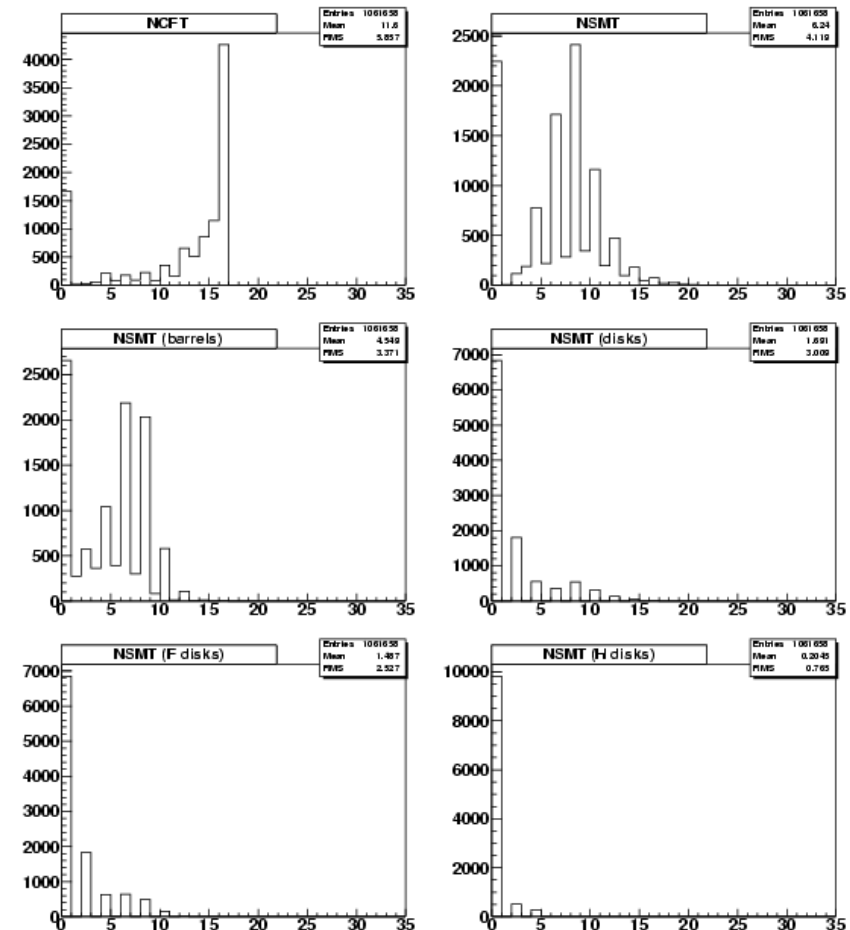- DCA distributions

Tracks (All)

Tracks in Recocert

- Basic underlying SMT/CFT quantities:

  - Number of CFT hits
  - Number of SMT hits
    - Barrels
    - Disks
    - F-Disks
    - H-Disks

Track Hits (All)

Conclusion

- There is a lot of monitoring in the online sector. This is where the main emphasis should be. Corrupted/missing data cannot be recovered.

- Online information finds its way into the run quality database. Could use some improvement: Should be standardized by the detector groups. CFT has a good start with the new run quality package. Is this the way to go?

- Feedback from offline would be helpful. It would be useful for detector people to know what the impact of their work on data quality is beyond the simple on/off. Especially track quantities that are sensitive to SMT quality / secondary vertexing would be useful. Recocert is a step in the right direction.

- It is planned to run Recocert over 20k – 30k events once per shift. This would allow for efficiency plots vs time.